

Inventory of flying, medium and large mammals from Parque Nacional Natural Tayrona, Magdalena, Colombia

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Mammals are among the most important species for ecosystems dynamics and functioning (Sinclair 2003, Schipper et al. 2008). However, they are currently threatened worldwide, with nearly 25% of all species under risk (Schipper et al. 2008). Protected areas are critical for conserving biodiversity (Chape et al. 2005), and are the last stronghold for preserving a complete representation of the world's ecosystems (Powell et al. 2000, Rodrigues et al. 2004, Forero-Medina & Joppa 2010). Despite their importance in conserving biodiversity, still basic information is lacking for its effective management (Chape et al. 2005, Knight et al. 2008). Previous analyses have assessed the degree of effectiveness of protected areas from a macroecological perspective (Chape et al. 2005, Ceballos 2007, González-Maya et al. 2015), but for most Latin American countries, still basic information regarding basic biodiversity inventories, and especially from mammals is lacking; undermining effective and efficient protected areas management. For Colombia this is especially critical, since most protected areas still lack the most basic mammal information, from inventories to most other ecological management-relevant information (Forero-Medina & Joppa 2010, Arias Alzate et al. 2012, Solari et al. 2013). Here we present the most updated inventory of flying, medium and large mammals from Parque Nacional Natural Tayrona, Magdalena, Colombia.

Parque Nacional Natural Tayrona (PNNT) is located in the Northern portion, Caribbean region, of Colombia, within the administrative boundaries of the Magdalena department (Figure 1). Considered part of the Sierra Nevada de Santa Marta piedmont, it was declared World's Natural Heritage Area by UNESCO (López et al. 2008). The PNNT covers approximately 15,000 ha and ranges from sea-level up to 1000 m asl (Figure 1). Given its location in the transition between tropical dry and moist forests and presence of thorny scrublands and cloud forests formations, PNNT harbors a unique sample of the Caribbean biodiversity (UAESPNN & ProCAT Colombia 2012).

From January to July 2012 we sampled for flying and medium and large mammals within the PNNT following a stratified design: our design included the definition of an equal-area hexagons grid over the park, each cell was classified according to ecosystem type, and a random selection of representative cells of each ecosystem according to its coverage within the park was made (Figure 1). We randomly selected a total of 60 cells distributed in 15 in dry forest, 15 in thorny scrubland and 30 in rainforest. For medium and large mammals we deployed 60 camera-traps in the 60 cells, considering a distance of at least 1 km between each cell; we complemented this sampling by covering 60 line transects monthly within each cell. For flying mammals we established four 12 m mist-nets in 29 cells, and sampled each for two nights each month; our sampling was carried out between 18h00 and 00h00.

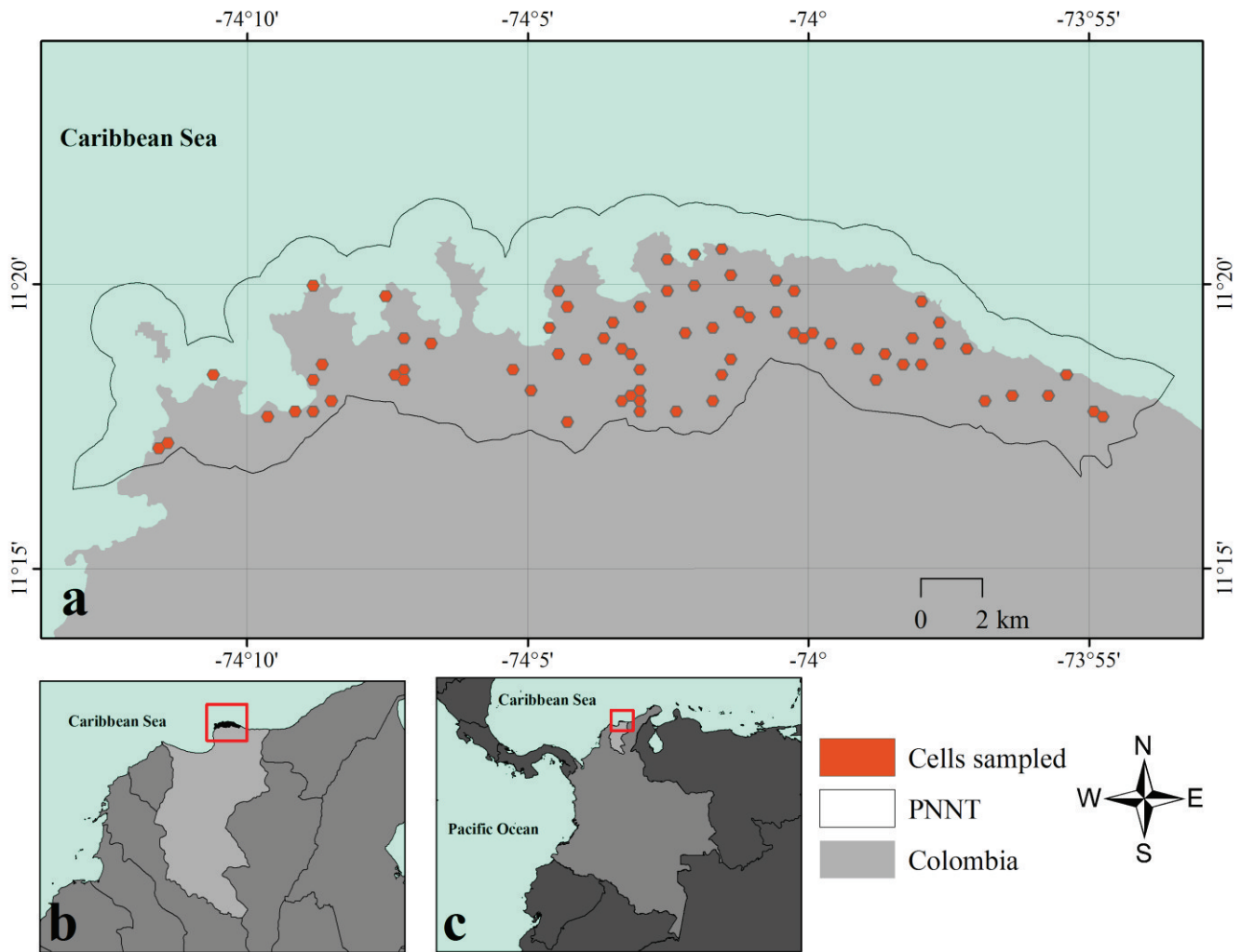


Figure 1. (a) Location of Tayrona National Park (PNNT) in the (b) Magdalena and (c) Colombia context (red square) and distribution of grid cells sampled for flying, medium and large mammal's inventory.

We obtained a list of 49 species for the PNNT (Table 1). For medium and large mammals we obtained a total of 467 captures in 1435 camera-trap nights and 403 detections in 41.67 km of transects. For this group we detected 25 species distributed in eight orders and 16 families, with the order Carnivora been the richest (10 spp.). Given that the detections were obtained by indirect sampling, both *Procyon* spp. and *Silvilagus* spp. are unconfirmed since differences with similar species are not identifiable by tracks or photos; nevertheless we suggest detections as *Procyon cancrivorus* and *Sylvilagus floridanus* based on the distribution of both species (both are indicated as cf in Table 1). Highlights of this group included the detection of four of the seven felid species reported for the country (*Puma concolor*, *P. yagouaroundi*, *Panthera onca*, *Leopardus pardalis* and *L. wiedii*; Solari et al. (2013)), and the records of the Vulnerable Grey-handed Night Monkey (*Aotus griseimembra*; Morales-Jiménez and Link (2008)) and the Critically Endangered Cotton-top Tamarin (*Saguinus oedipus*; Savage and Causado (2014)), although is considered as introduced in the park (García Villareal (2010); Table 1).

Regarding flying mammals we captured 486 bats in 782.5 hours/m²r effective sampling. We recorded a total of 24 species distributed in four families, where family Phyllostomidae represented the highest richness (19 spp.; Table 1). The most abundant bat species were *Carollia perspicillata* and *Uroderma bilobatum* (131 and 104 individuals, respectively).

In terms of conservation status, we found ~82% of species are considered Least Concern, 6% Data Deficient, 4% both Near Threatened, 4% Vulnerable and 2% for Critically Endangered according to the IUCN Red List of Threatened Species (IUCN 2012); one species still has no conservation status according to IUCN (NA: Not assessed; Table1).

Table 1. List of flying and medium and large-size mammal species recorded for the Tayrona National Park, Colombia, and its conservation status according to IUCN (2014). LC: Least Concern, DD: Data Deficient, NT: Near Threatened, VU: Vulnerable and CR: Critically Endangered and NA: Not assessed. Species indicated with cf are those not confirmed to the species level and are assigned according to distribution.

Order	Family	Species	IUCN Status
Chiroptera	Phyllostomidae	<i>Mimon crenulatum</i>	LC
		<i>Micronycteris schmidtorum</i>	LC
		<i>Phyllostomus discolor</i>	LC
		<i>Phyllostomus hastatus</i>	LC
		<i>Tonatia saurophila</i>	LC
		<i>Artibeus lituratus</i>	LC
		<i>Artibeus planirostris</i>	LC
		<i>Chiroderma villosus</i>	LC
		<i>Platyrrhinus angustirostris</i>	NA
		<i>Platyrrhinus helleri</i>	LC
		<i>Sturnira lilium</i>	LC
		<i>Uroderma magnirostrum</i>	LC
		<i>Vampyressa thuyone</i>	LC
		<i>Uroderma bilobatum</i>	LC
		<i>Carollia brevicauda</i>	LC
		<i>Carollia perspicillata</i>	LC
		<i>Glossophaga longirostris</i>	DD
		<i>Glossophaga soricina</i>	LC
		<i>Desmodus rotundus</i>	LC
	Mormoopidae	<i>Mormoops megalophylla</i>	LC
		<i>Pteronotus parnellii</i>	LC
Carnivora	Emballonuridae	<i>Saccopteryx bilineata</i>	LC
		<i>Saccopteryx canescens</i>	LC
	Vespertilionidae	<i>Rhogeessa io</i>	LC
	Felidae	<i>Puma concolor</i>	LC
		<i>Leopardus pardalis</i>	LC
		<i>Leopardus wiedii</i>	NT
		<i>Panthera onca</i>	NT
		<i>Puma yagouaroundi</i>	LC
	Canidae	<i>Cerdocyon thous</i>	LC
	Mephitidae	<i>Conepatus semistriatus</i>	LC
	Procyonidae	<i>Procyon cf cancrivorus</i>	LC
Primates	Mustelidae	<i>Eira barbara</i>	LC
		<i>Galictis vittata</i>	LC
	Atelidae	<i>Alouatta seniculus</i>	LC
	Callitrichinae	<i>Saguinus oedipus</i>	CR
	Cebidae	<i>Cebus albifrons</i>	LC
Cetartiodactyla	Aotidae	<i>Aotus griseimembra</i>	VU
	Cervidae	<i>Odocoileus virginianus</i>	LC
		<i>Mazama sanctaemartae</i>	DD
Rodentia	Tayassuidae	<i>Pecari tajacu</i>	LC
	Cuniculidae	<i>Cuniculus paca</i>	LC
Pilosa	Dasyproctidae	<i>Dasyprocta punctata</i>	LC
	Myrmecophagidae	<i>Myrmecophaga tridactyla</i>	VU
		<i>Tamandua mexicana</i>	LC
Cingulata	Dasypodidae	<i>Dasypus novemcinctus</i>	LC
		<i>Cabassous centralis</i>	DD
Lagomorpha	Leporidae	<i>Sylvilagus cf floridanus</i>	LC
Didelphimorphia	Didelphidae	<i>Didelphis marsupialis</i>	LC

To date no systematic inventories of mammals had been undertaken for this park, and the only available information was presented in the Management Plan of the area (Sánchez-Herrera et al. 2006) and few other small studies. These previous efforts only recorded eight species for the park (UAESPNN & ProCAT Colombia 2012) and the Management Plan listed 10 terrestrial species and 40 bats but with no supporting information (Sánchez-Herrera et al. 2006). Therefore this is the first systematic effort to document mammal fauna within PNNT, and for a Protected Area in the Caribbean of Colombia, significantly increasing the number of species for the area and the Protected Areas sub-system (SIRAP Caribe). Considering the ongoing financial and operational constraints for protected areas management in Latin America, this information is of great importance for the adequate management of this important area of the Caribbean region of Colombia.

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